

GLASS MELTING BURNER-V2
100 kW & 200 kW

INSTALLATION, ASSEMBLY,
AND MAINTENANCE PROCEDURES

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1 - INTRODUCTION

GLASS MELTING BURNER-V2 (Figure 1) is a burner specially developed for glass furnaces. It completes the scale of GLASS MELTING BURNER (tube in tube).

Presently, two ranges of nominal power exist:

GLASS MELTING BURNER-V2 100 (100 kW at the nominal power, Gas version).

GLASS MELTING BURNER-V2 200 (200 kW at the nominal power, Gas version).

Demonstrated benefits of this burner technology are:

- ◆ To improve the centring of the Gas injector in the refractory block.
- ◆ To decrease the overall dimensions of the refractory block.
- ◆ To decrease the overall dimensions of the burner body.
- ◆ To facilitate the implementation of the burner on small furnaces.

This burner is cooling in operation with fluids flowing, like our scale of GLASS MELTING BURNER. An air cooling is only necessary when the burner is stopped.

It can operate with natural gas or propane.

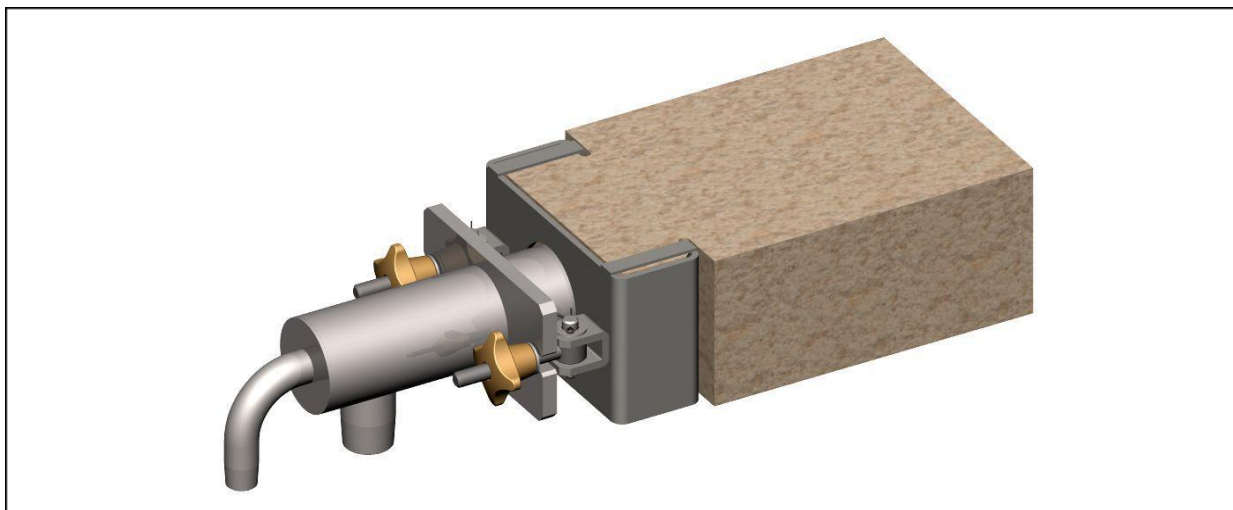


Figure 1

2 - DESCRIPTION OF THE GLASS MELTING BURNER-V2

The GLASS MELTING BURNER-V2 is composed of (see figure 2) :

- ◆ The burner block (1) made of refractory material.
- ◆ The bracket adapter (2) in stainless steel for mounting the burner on the block.
- ◆ A ceramic paper gasket (3) to be positioned between the refractory block and the burner.
- ◆ The burner body (4) in stainless steel.
- ◆ The fuel gas lance (5) with a high temperature alloy injector (6).

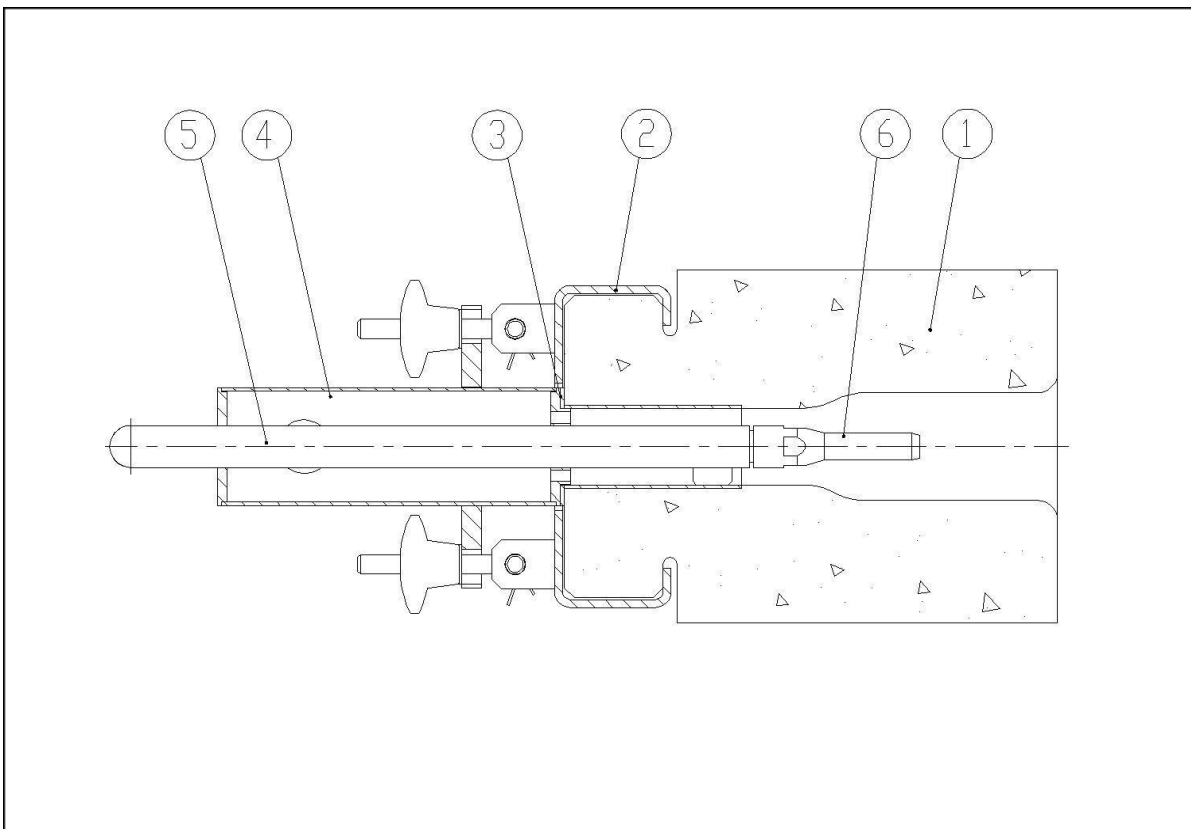


Figure 2

3 - INSTALLATION OF THE BURNER

3.1- PREPARATION OF THE BURNER PARTS

The burner is delivered "oxygen clean". Before assembling the burner, make sure that all parts have not been contaminated by grease, oil or particulates. If it has been contaminated, all metallic parts of the burner must be cleaned one by one in order to eliminate all traces of oil or grease and particulates. Use only oxygen compatible products for this operation.

In case of doubt on what product to use and procedure, contact an Air Liquide representative.

3.2- INSTALLATION OF THE BRACKET ADAPTER

A metallic stop (1) permits to maintain the bracket adapter on the refractory block as described on the figure 3.

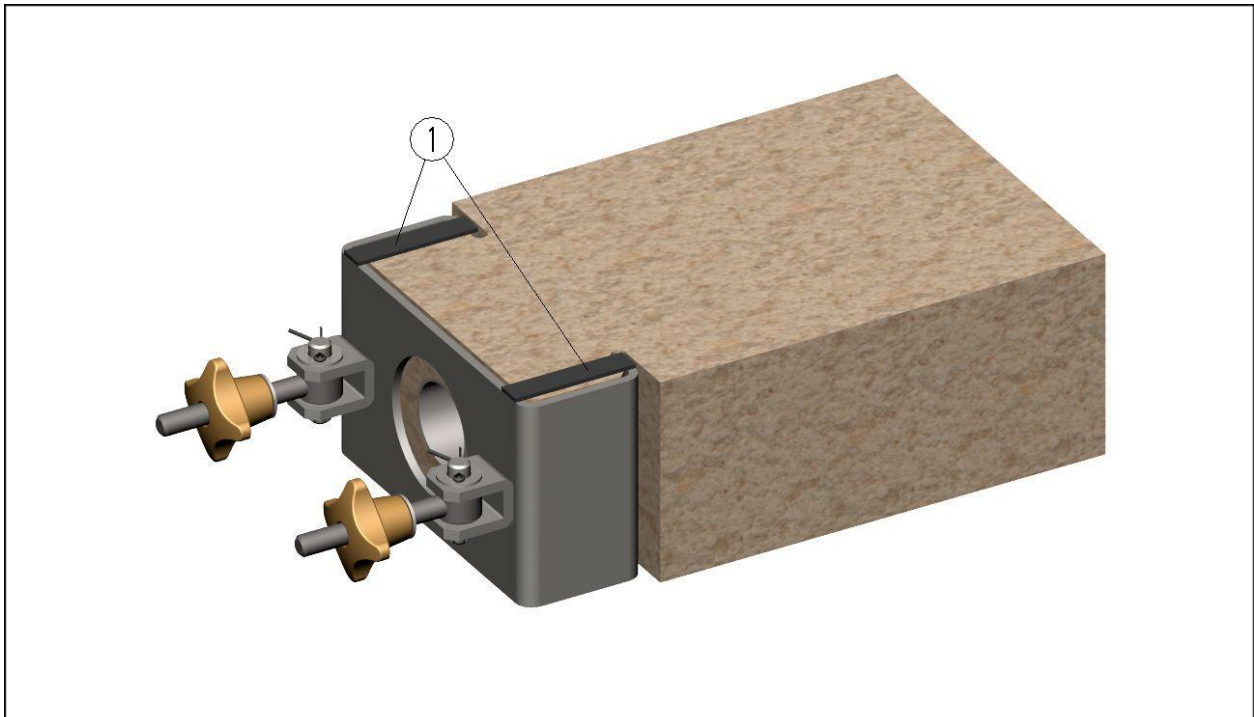


Figure 3

3.3 - INSTALLATION OF THE BURNER BLOCK

Before installing the burner block, check that the support is horizontal or inclined no more than 2 ° toward the glass surface, to make sure that the flame is not oriented towards the crown of the furnace.

New furnace (cold installation)

- ◆ Place the burner block with its bracket adapter in the dedicated furnace opening.
- ◆ Ensure a proper tightness around the burner block with a heat resistant material.
- ◆ Start the burner as soon as possible.

Existing furnace (hot installation)

- ◆ Preheat the block and its adapter to remove all moisture.
- ◆ Position the block and its adapter in front of the furnace.
- ◆ To avoid thermal shock, push the block with its adapter slowly into the opening, at a rate of 2 inches per hour for the first 6 inches, and 4 inches per hour afterwards (or follow the specific burner block manufacturer instruction).
- ◆ Start the burner as soon as possible.

3.4 - INSTALLATION OF THE FUEL GAS INJECTOR

- ◆ Screw the fuel gas injector (1) on the fuel gas lance (2) as described on figure 4 :
 - **Use a special grease compatible with oxygen.**
 - **Tightening must be done by hand.**

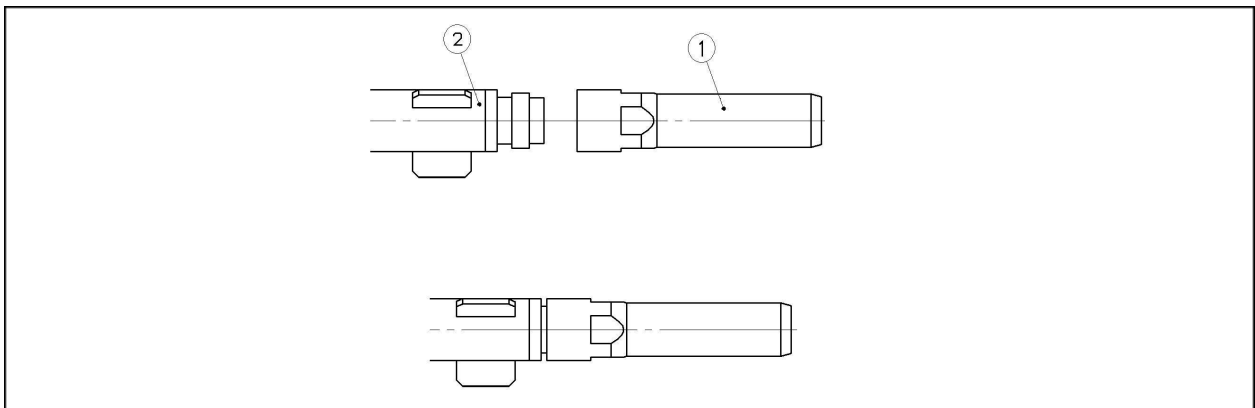


Figure 4

3.5 - COOLING OF THE BURNER

When the burner is turn off, there is immediately a cooling (nitrogen or oil free dry air) supplied in the principal oxygen hose to protect the burner and the injector (see figure 5).

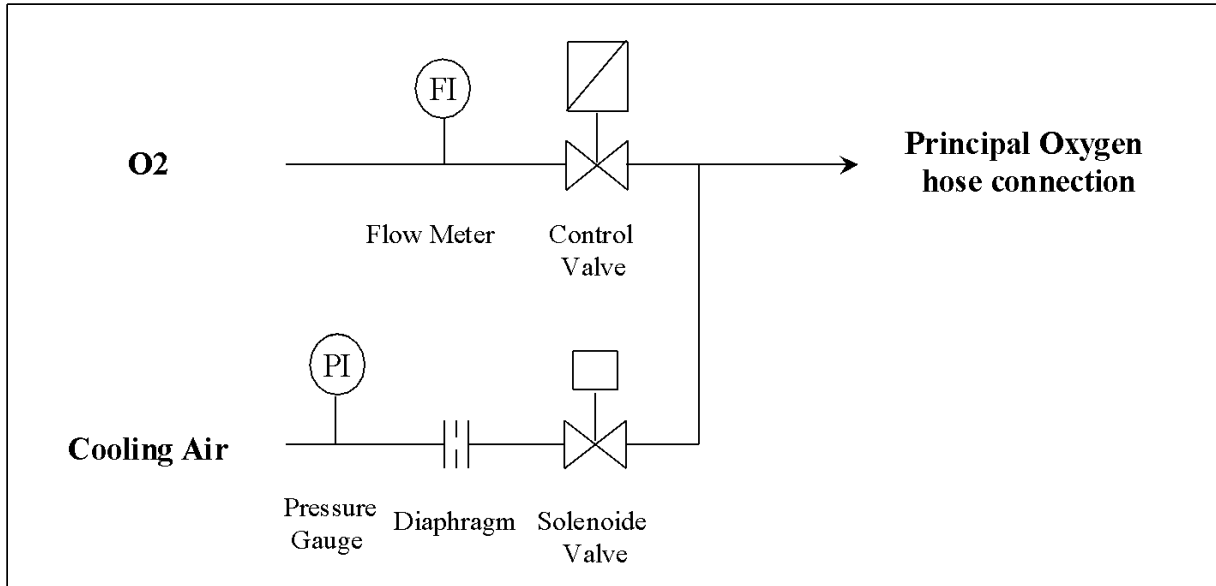


Figure 5

3.6 - INSTALLATION OF THE BURNER ON THE BLOCK

Install the burner on the block just before firing it.

- ◆ Connect the oxygen hose to the burner.
- ◆ Check that nitrogen or oil free dry cooling air is supplied at the burner.
- ◆ Place the ceramic gasket on the burner body.
- ◆ Check that the inside of the block is not obstructed by foreign materials (fibrous refractory or glass condensates).
- ◆ Place the burner in the block (Figure 6). Place the bracket adapter bolts in the burner body plate slots, and tighten them to compress the ceramic gasket.
- ◆ Connect the fuel gas hose to the burner.
- ◆ To avoid the over heating of the injector, firing the burner as soon as possible.
- ◆ Cooling nitrogen or air must flow the burner if the burner stops. If not, the burner must be dismantled from the block.

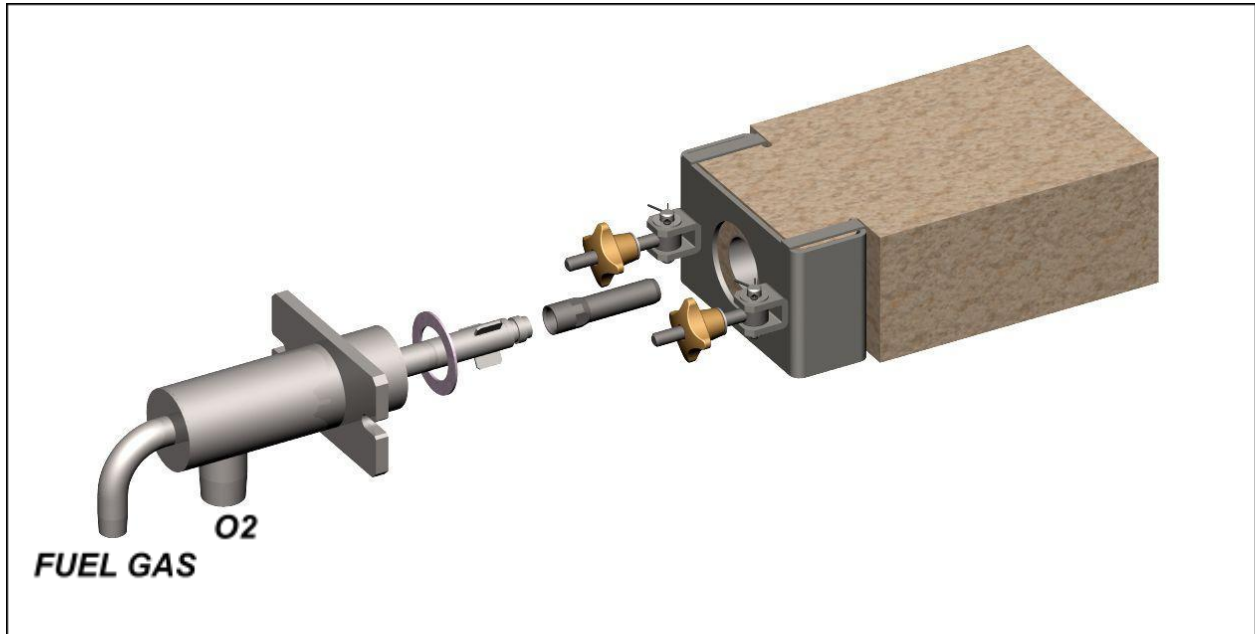


Figure 6

4 - BURNER MAINTENANCE

It may be necessary to remove a burner for regular maintenance inspections, or when the burner will not be used for a long period of time.

4.1- INSPECTION OF THE INJECTORS

- ◆ Turn the burner off: there is immediately a cooling nitrogen or oil free dry air supplied in the burner to protect the tip.
- ◆ Disconnect the fuel gas hose.
- ◆ Remove the burner from the refractory block.
- ◆ Check the injector and the inside of the burner block.
- ◆ **Replace the fuel gas injector if necessary (check that the new injector is free of traces of oil and grease, and clean if necessary).**
- ◆ Re-install the burner.
- ◆ Connect the fuel gas hose.

The burner is operational and can be firing.

During the first month of operation of the burner, inspection of the injector must be carried out every week. During the second month, the period between inspections can be extended to two weeks. Air Liquide recommends that each injector is inspected every month, and every time a burner is left in the furnace without cooling air.

4.2 - UNMOUNTING THE BURNER

When the burner is not going to be used for extended periods of time, the burner should be removed from the burner block.

- ◆ Turn the burner off. Nitrogen or air cooling is flowing in the burner.
- ◆ Remove the fuel gas hose.
- ◆ Remove the burner body from the burner block.
- ◆ Remove the oxygen hose.
- ◆ Plug the block orifice with alumina wool.
- ◆ Store the burner body and the injector in a clean area.

A burner that was previously removed may be re-installed by following the same procedure as described in Chapter 3. **Use only new ceramic gaskets for the burner body block tightness.**

The inside of the block has to be inspected and cleaned if necessary.

4.3 - MAINTENANCE

Every time a burner is unmounted, a cleaning of the metallic parts that are in contact with pure oxygen by a specific cleaner product for oil and grease is mandatory.

5 - SAFETY WITH OXY-COMBUSTION

Every operator who manipulates the GLASS MELTING BURNER-V2 should be trained on oxygen safety procedures. In particular, operators must be aware of the following safety instructions for oxygen utilisation:

- ◆ **Never use oil or grease for oxygen piping, nor assembling burner parts.**
- ◆ **Do not use organic materials for tightness components.**
- ◆ **Always clean all parts before installing them.**

Failure to respect these instructions may cause ignition in the oxygen circuit, and further propagation along the oxygen piping.

6 - APPENDIX

6.1 REFERENCES

6.11 References for the GLASS MELTING BURNER-V2 100 kW with Natural Gas

Air Liquide references	Description
1475 2110 1105	Complete burner (without refractory block) with natural gas injector 30 m/s
1475 2110 1205	Complete burner (without refractory block) with natural gas injector 60 m/s
1475 2000 1100	Natural Gas injector (30 m/s)
1475 2000 1200	Natural Gas injector (60 m/s)
1475 2100 0000	Claw
1475 2200 0000	Refractory block
1475 2010 0000	Body
1475 2000 0005	Ceramic fiber gasket

6.12 References for the GLASS MELTING BURNER-V2 100 kW with Propane

Air Liquide references	Description
1475 2110 2105	Complete burner (without refractory block) with propane injector 30 m/s
1475 2110 2205	Complete burner (without refractory block) with propane injector 60 m/s
1475 2000 2100	Propane injector (30 m/s)
1475 2000 2200	Propane injector (60 m/s)
1475 2100 0000	Claw
1475 2200 0000	Refractory block
1475 2010 0000	Body
1475 2000 0005	Ceramic fiber gasket

6.13 References for the GLASS MELTING BURNER-V2 200 kW with Natural Gas

Air Liquide references	Description
1475 3110 1105	Complete burner (without refractory block) with natural gas injector 30 m/s
1475 3110 1205	Complete burner (without refractory block) with natural gas injector 60 m/s
1475 3000 1100	Natural Gas injector (30 m/s)
1475 3000 1200	Natural Gas injector (60 m/s)
1475 3100 0000	Claw
1475 3200 0000	Refractory block
1475 2010 0000	Body
1475 3000 0005	Ceramic fiber gasket

6.14 References for the GLASS MELTING BURNER-V2 200 kW with Propane

Air Liquide references	Description
1475 3110 2105	Complete burner (without refractory block) with propane injector 30 m/s
1475 3110 2205	Complete burner (without refractory block) with propane injector 60 m/s
1475 3000 2100	Propane injector (30 m/s)
1475 3000 2200	Propane injector (60 m/s)
1475 3100 0000	Claw
1475 3200 0000	Refractory block
1475 2010 0000	Body
1475 3000 0005	Ceramic fiber gasket

6.2 BURNER SPECIFICATIONS

6.21 Burner specifications for the GLASS MELTING BURNER-V2 100 kW

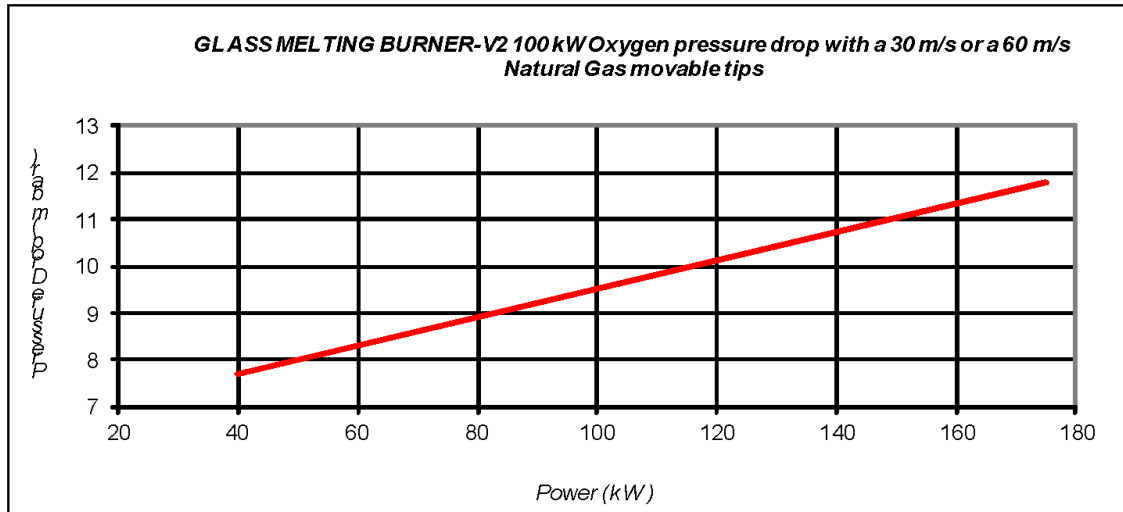
Model	GLASS MELTING BURNER-V2 100 kW Natural Gas	GLASS MELTING BURNER-V2 100 kW Propane
Max - Power	175 kW	175 kW
Nominal - Power	100 kW	100 kW
Min - Power	40 kW	40 kW
Cooling Air Flow	10 Nm ³ /h	10 Nm ³ /h
O ₂ inlet	1"	1"
Fuel Gas inlet	1/2"	1/2"

6.22 Burner specifications for the GLASS MELTING BURNER-V2 200 kW

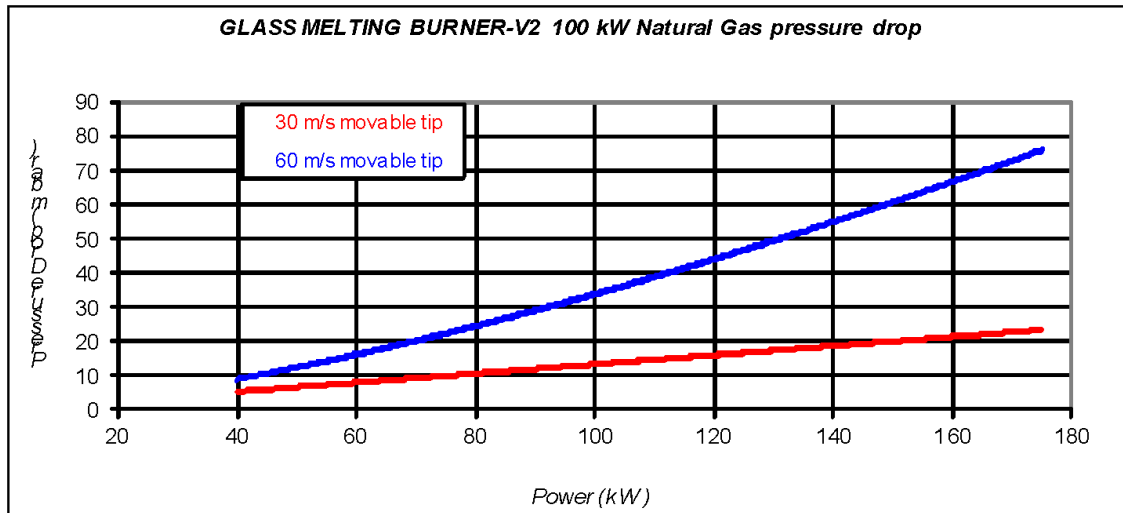
Model	GLASS MELTING BURNER-V2 200 kW Natural Gas	GLASS MELTING BURNER-V2 200 kW Propane
Max - Power	350 kW	350 kW
Nominal - Power	200 kW	200 kW
Min - Power	80 kW	80 kW
Cooling Air Flow	20 Nm ³ /h	20 Nm ³ /h
O ₂ inlet	1"	1"
Fuel Gas inlet	1/2"	1/2"

6.3 PRESSURE DROP

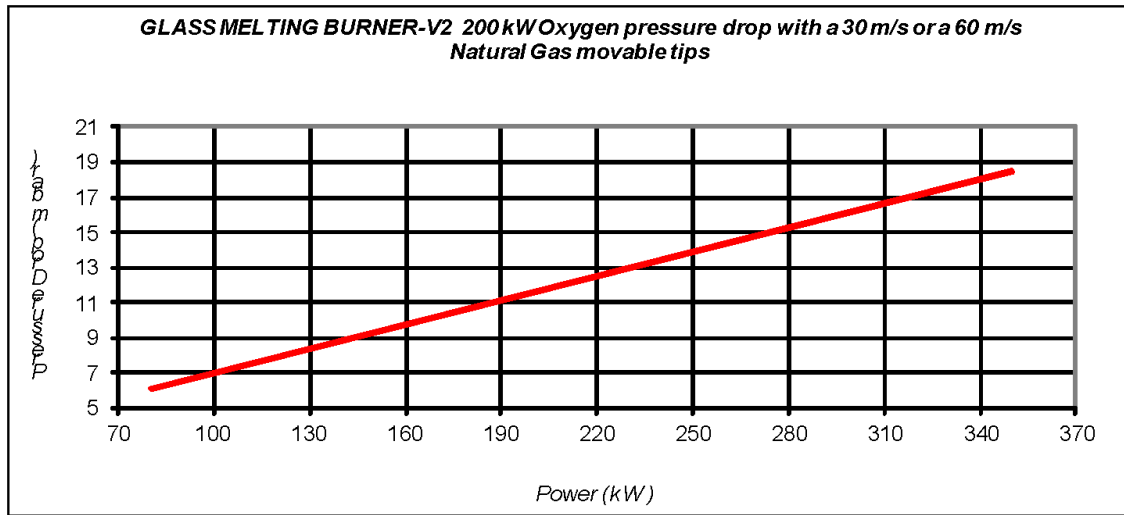
6.31 Oxygen pressure drop for the GLASS MELTING BURNER-V2 100 kW



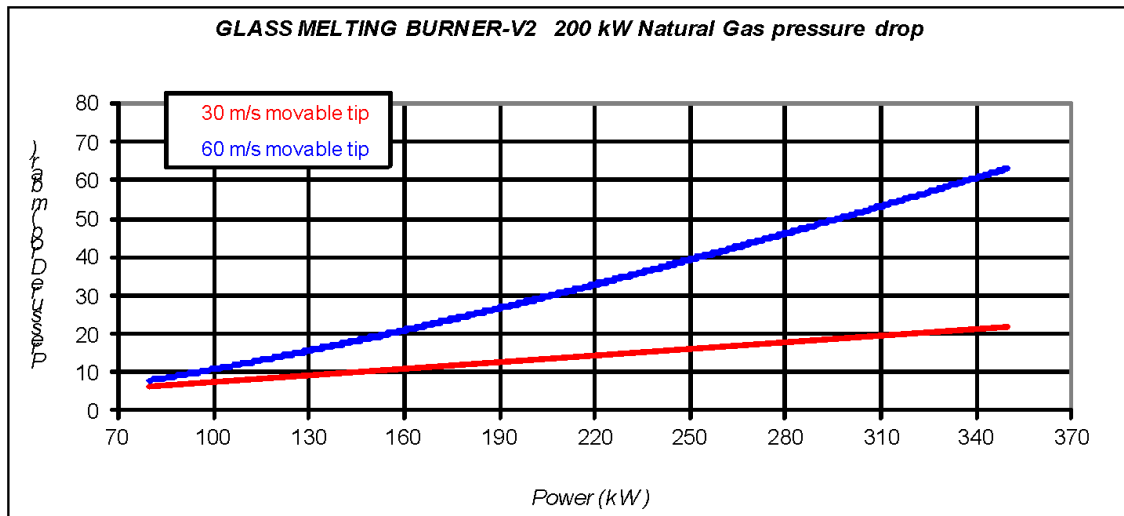
6.32 Natural Gas pressure drop for the GLASS MELTING BURNER-V2 100 kW



6.33 Oxygen pressure drop for the GLASS MELTING BURNER-V2 200 kW



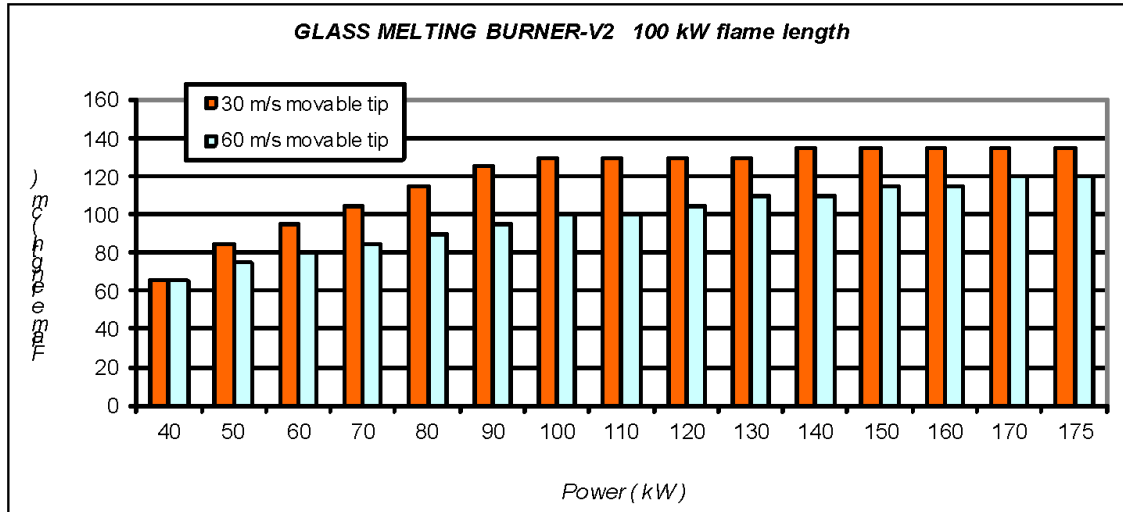
6.34 Natural Gas pressure drop for the GLASS MELTING BURNER-V2 200 kW



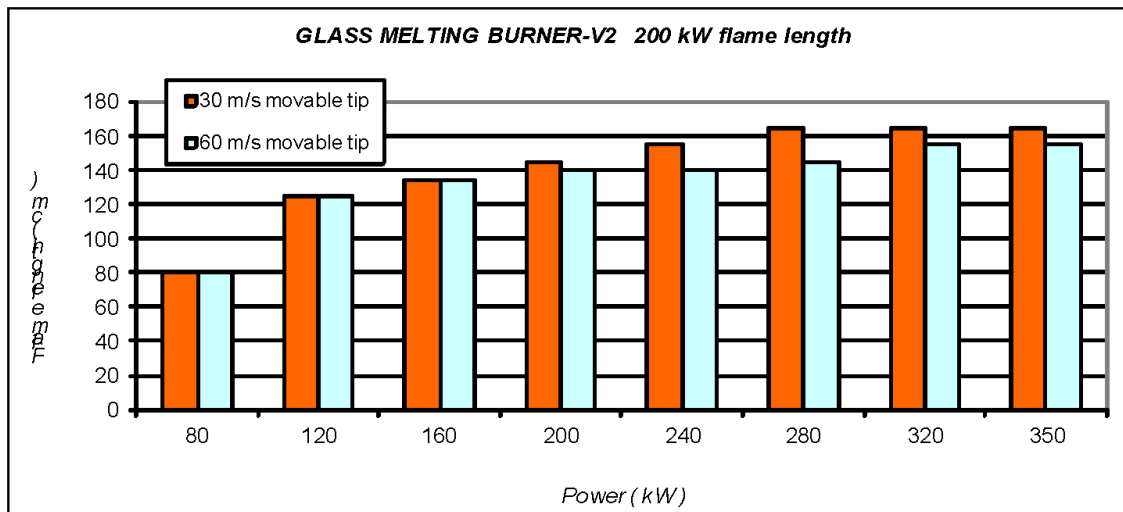
6.4 FLAME LENGTH

Visible flame length is determined on our visualization tunnel in an ambient temperature.

6.41 Flame length of the GLASS MELTING BURNER-V2 100 kW

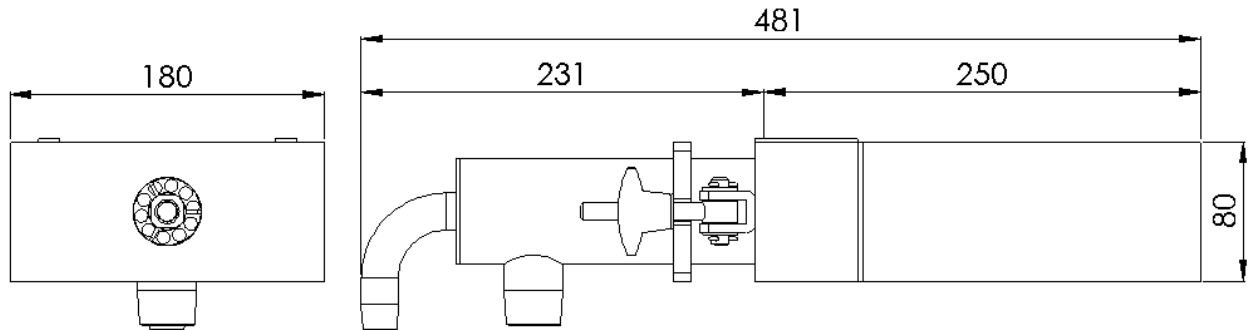


6.42 Flame length of the GLASS MELTING BURNER-V2 200 kW



6.5 DIMENSIONS

6.51 Dimensions of the GLASS MELTING BURNER-V2 100 kW



6.51 Dimensions of the GLASS MELTING BURNER-V2 200 kW

